

SAFETY DATA SHEET

ENERGY SPRING TPEO & GEN Series — Marine Engine Oils

Issued in accordance with Singapore Standard SS 586-3:2022 (16-section GHS format). This document supersedes all previous versions.

SECTION 1 - Identification of the substance / mixture and of the supplier

1.1 Product identifier	NS GEN 312, NS GEN 412, NS TPEO 320, NS TPEO 420, NS TPEO 330, NS TPEO 430, NS TPEO 440
Product family	GEN series: medium-BN diesel engine oils for generator sets and auxiliary engines. TPEO series: high-BN trunk piston engine oils for medium-speed marine diesel engines. Both series share the same base oil and additive chemistry and are therefore covered by a single safety data sheet.
Grade(s)	SAE 30 and SAE 40; Base Number (BN) 12, 20, 30 and 40 mg KOH/g. See the product table below.
Chemical identity	Mixture of highly refined mineral base oils and additives
CAS number	Not applicable (mixture)
1.2 Relevant identified uses	GEN series (BN 12): lubricant for diesel generator sets and auxiliary engines operating on distillate fuel (MGO / MDO). TPEO series (BN 20 - 40): lubricant for medium-speed marine trunk piston diesel engines operating on residual or distillate fuel, and for associated auxiliary equipment. Industrial / professional use only.
Uses advised against	Any use other than that stated above. Not for use as a fuel, solvent, cleaning agent, mould release agent or for any medicinal, food-contact or personal-care purpose.
1.3 Supplier of the safety data sheet	ENERGY SPRING PTE LTD 3 Temasek Avenue, #21-00 Centennial Tower Singapore 039190 Tel: +65 6993 9836 E-mail: info@energy-spring.sg Web: https://energy-spring.sg/
Manufactured / blended by	Product supplied under a manufacturing agreement. Manufacturer details available from ENERGY SPRING PTE LTD on request.
1.4 Emergency telephone number	ENERGY SPRING PTE LTD (office hours, Mon - Fri 09:00 - 18:00 SGT): +65 6993 9836 Singapore - emergency services (SCDF: ambulance and fire): 995 Singapore - Drug and Poison Information Centre (DPIC), Singapore General Hospital, 24-hour hotline: +65 6423 9119 Outside Singapore: contact the local emergency services or the national poison information centre for the country in which the incident occurs.

Product	Series	SAE viscosity grade	Base Number (BN), mg KOH/g
NS GEN 312	GEN	SAE 30	12
NS GEN 412	GEN	SAE 40	12
NS TPEO 320	TPEO	SAE 30	20
NS TPEO 420	TPEO	SAE 40	20
NS TPEO 330	TPEO	SAE 30	30
NS TPEO 430	TPEO	SAE 40	30
NS TPEO 440	TPEO	SAE 40	40

SECTION 2 - Hazards identification

2.1 Classification of the substance or mixture	GHS classification (SS 586-2 / SS 586-3): Not classified as hazardous. The mixture has been assessed against the classification criteria of SS 586. The hazardous components identified in Section 3 are present below the generic concentration limits of SS 586-2 given in Section 11, and therefore do not trigger classification of the mixture.
2.2 Label elements	Pictogram: None required Signal word: None required Hazard statements: None required Supplemental information: Contains long chain alkyl phenol. May produce an allergic reaction. Recommended handling precautions (good occupational practice, not label elements): P102: Keep out of reach of children. P262: Do not get in eyes, on skin, or on clothing. P264: Wash skin thoroughly after handling. P280: Wear protective gloves and eye / face protection. P273: Avoid release to the environment. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor. P501: Dispose of contents and container in accordance with local regulations.
2.3 Other hazards	Prolonged or repeated skin contact with the fresh product may cause defatting of the skin, leading to dryness, redness or dermatitis. Used oil: during service the oil becomes contaminated with combustion products and wear metals. Used engine oil has been shown to cause skin cancer in laboratory animals following prolonged, repeated exposure. Avoid skin contact with used oil and remove promptly with soap and water. Hydrogen sulphide (H₂S): the product contains thermally sensitive components. Heating above the maximum handling temperature may release toxic hydrogen sulphide. Do not heat above 65 °C (149 °F). Oil mist: generation of mist, vapour or aerosol above the applicable occupational exposure limit (Section 8) may cause respiratory irritation. Slip hazard: spillages produce slippery surfaces. The mixture does not meet the criteria for PBT or vPvB.

SECTION 3 - Composition / information on ingredients

Component	CAS number	Approx. % w/w	GHS classification
Distillates (petroleum), hydrotreated light paraffinic	64742-55-8	0 - 20	Asp. Tox. 1; H304
Distillates (petroleum), solvent-dewaxed heavy paraffinic	64742-65-0	60 - < 98	Asp. Tox. 1; H304
Distillates (petroleum), hydrotreated heavy paraffinic	64742-62-7	10 - 30	Asp. Tox. 1; H304
Long chain alkyl phenol	Trade secret	0.2 - < 2.0	Skin Sens. 1; H317 Acute Tox. 5; H303 STOT RE 2; H373
Phosphorodithioic acids, mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters, zinc salts	84605-29-8	0.1 - < 1	Skin Irrit. 2; H315 Eye Dam. 1; H318 Aquatic Chronic 2; H411
Zinc dialkyldithiophosphate	68649-42-3	0 - < 1	Skin Irrit. 2; H315 Aquatic Acute 2; H401 Aquatic Chronic 2; H411

- Substance / mixture: Mixture.
- The base oils in this product are highly refined mineral oils containing less than 3% (w/w) DMSO extract when tested by IP 346. Aspiration toxicity classification of the individual base oil streams does not apply to the finished mixture, whose kinematic viscosity exceeds 20.5 mm²/s at 40 °C.

- Long chain alkyl phenol is present at a concentration which may fall either side of the 1% generic concentration limit for skin sensitisation. Where the concentration in the finished blend is 1% or greater, the mixture is to be classified Skin Sens. 1; H317 and Sections 2 and 15 amended accordingly. Batch composition is to be confirmed with the manufacturer.
- Test data on the zinc dithiophosphate impurity overrides the calculated aquatic classification contribution (see Section 12). The environmental classification of that impurity is therefore not taken into account when calculating the overall GHS classification of the mixture.
- Any concentration shown as a range is given to protect confidentiality or is due to batch-to-batch variation.
- There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4 - First aid measures

4.1 Description of first aid measures - General	No hazards requiring special first aid measures are expected under normal conditions of use. In the event of serious problems, call a doctor or summon medical assistance urgently. Show this safety data sheet to the medical personnel in attendance.
Inhalation	Move the person to fresh air. If breathing is difficult, give oxygen. If the person is not breathing, apply artificial respiration and obtain medical attention immediately.
Skin contact	Remove contaminated clothing and shoes. Wash the affected area with soap and water. Do not use solvents or thinners. If irritation or rash develops or persists, obtain medical advice. Launder contaminated clothing before reuse; discard contaminated leather articles. High-pressure injection injury: if the product is injected under the skin by a high-pressure system, obtain medical attention immediately. Injuries may appear trivial at first but require urgent surgical treatment.
Eye contact	Remove contact lenses if worn and easy to do. Flush the eyes with clean water or sterile eye wash for at least 15 minutes, holding the eyelids apart. If irritation persists, obtain medical advice.
Ingestion	Do not induce vomiting, because of the risk of aspiration into the lungs. If the person is conscious, rinse the mouth and give water or milk to drink. Never give anything by mouth to an unconscious person. Obtain medical attention as soon as possible.
4.2 Most important symptoms and effects, both acute and delayed	Skin: dryness, redness, cracking or dermatitis after prolonged or repeated contact. Eyes: transient discomfort or mild redness on direct contact. Inhalation of mist: coughing, difficulty breathing or other respiratory irritation at concentrations above the exposure limit given in Section 8. Ingestion: nausea and irritation of the gastrointestinal tract.
4.3 Indication of any immediate medical attention and special treatment needed	Treat symptomatically. Aspiration of liquid into the lungs may cause chemical pneumonitis and should be managed accordingly. No specific antidote is required.

SECTION 5 - Fire-fighting measures

5.1 Extinguishing media	Suitable: foam, dry chemical powder, carbon dioxide, water fog or water spray. Use extinguishing methods suitable to the surrounding conditions. Unsuitable: direct water jet, which may spread the fire.
5.2 Special hazards arising from the substance or mixture	This product is a combustible liquid with a high flash point (see Section 9); it does not readily ignite but will burn once heated above its flash point. Combustion or thermal decomposition produces a complex mixture of airborne solids, liquids and gases, highly dependent on combustion conditions, including carbon monoxide, carbon dioxide, oxides of sulphur and phosphorus, zinc compounds and unidentified organic compounds. Hydrogen sulphide may be released from overheated product. Containers exposed to fire may rupture. Cool exposed containers with water spray.
5.3 Advice for fire-fighters	Wear full protective clothing and self-contained positive-pressure breathing apparatus. Prevent fire-fighting water run-off from entering drains, sewers or watercourses. See Section 7 for proper handling and storage.

SECTION 6 - Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures	Depending on the risk of exposure, wear gloves, goggles and protective clothing (see Section 8). Remove all sources of ignition. Ensure adequate ventilation. Beware of slippery surfaces and floors.
6.2 Environmental precautions	Prevent the product from entering drains, sewers, soil, surface water or groundwater. Design installations and take all measures necessary to avoid water and soil pollution: bunding, containment, absorbent materials. Inform the relevant authorities if the product has entered the environment or a public sewer.
6.3 Methods and material for containment and cleaning up	Small spillages: absorb with sand, earth or a proprietary inert absorbent and transfer to a labelled, closable container for disposal. Large spillages: dam the spill and recover the free product by pumping or with suitable physical means. Send contaminated materials to an approved collection or disposal facility. Marine spillage: apply the vessel's Shipboard Oil Pollution Emergency Plan (SOPEP) and report in accordance with MARPOL Annex I requirements.
6.4 Reference to other sections	See Section 8 for personal protective equipment and Section 13 for disposal.

SECTION 7 - Handling and storage

7.1 Precautions for safe handling	Avoid contaminating soil or releasing this material into sewage or drainage systems and bodies of water. Do not get in eyes, on skin or on clothing. Keep out of the reach of children. Wash thoroughly after handling. Do not eat, drink or smoke in areas where the product is handled. Ensure adequate ventilation where there is any risk of vapours, mists or aerosols forming. This product may contain a thermally sensitive substance. Do not heat above the maximum handling temperature, in order to minimise possible release of toxic hydrogen sulphide. Do not heat above: 65 °C (149 °F). Avoid the accumulation of static electricity; provide earthing and bonding. Review all operations which have the potential to generate and accumulate an electrostatic charge and/or a flammable atmosphere - including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation and vacuum truck operations - and apply appropriate mitigating procedures.
7.2 Conditions for safe storage, including any incompatibilities	Store in a cool, dry, well-ventilated area, away from sources of heat, ignition and direct sunlight, and away from strong oxidising agents (see Section 10). Keep containers tightly closed and correctly labelled. Use only receptacles, joints, pipes and fittings which are resistant to hydrocarbons. Minimise periods of exposure to high temperature. Avoid water contamination. Recommended storage temperature: 0 °C to 45 °C. Container warning: containers are not designed to contain pressure. Do not use pressure to empty a container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid and/or vapour) and can be dangerous. Do not pressurise, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, static electricity or other sources of ignition; they may explode and cause injury or death. Empty containers should be completely drained, properly closed and promptly returned to a drum reconditioner or disposed of properly.
7.3 Specific end use(s)	Marine trunk piston and generator engine lubrication. Select the BN grade according to the sulphur content of the fuel in use. Refer to the product technical data sheet and to the engine builder's instructions.

SECTION 8 - Exposure controls / personal protection

8.1 Control parameters — occupational exposure limits

Component / parameter	Source	TWA (8 h)	STEL / Ceiling
Oil mist, mineral	Singapore PEL (WSH Regulations)	5 mg/m3	10 mg/m3 (STEL)

Component / parameter	Source	TWA (8 h)	STEL / Ceiling
Oil mist, mineral	ACGIH TLV	5 mg/m ³	10 mg/m ³ (STEL)

8.1 Control parameters - note	Limits and standards are shown for guidance only. Follow applicable national regulations. No biological limit values have been established for this product. DNEL / PNEC: not determined for this mixture.
8.2 Exposure controls - general considerations	Consider the potential hazards of this material (Section 2), the applicable exposure limits, the job activities and other substances in the workplace when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment, since protection is usually provided for a limited time or under certain circumstances only. If decomposition is suspected, or if the product has been overheated, do not open the container; discontinue heating and secure the unit. Initiate emergency procedures, taking all necessary precautions to avoid exposure to noxious or flammable gases (e.g. hydrogen sulphide), such as evacuation of contaminated areas and use of suitable respiratory protection.
Engineering controls	Use the product in a well-ventilated area. Provide local exhaust ventilation where mist or vapour may be generated. Use anti-deflagrating materials and equipment where appropriate. Provide eyewash facilities and safety showers close to the working area.
Respiratory protection	Not normally required. Where the oil mist concentration may exceed the exposure limit, wear an approved respirator fitted with an organic vapour / particulate filter (e.g. type A-P2) or air-supplied breathing apparatus.
Hand protection	Impermeable hydrocarbon-resistant gloves. Suitable materials include nitrile rubber, 4H (PE/EVAL), Viton and Silver Shield. Breakthrough time to be confirmed with the glove supplier. Replace gloves immediately if damaged or contaminated internally.
Eye protection	Safety glasses with side shields. Wear chemical goggles or a face shield where splashing or emission of mist is possible.
Skin and body protection	Overalls or protective clothing which prevents skin contact. Safety footwear. Avoid keeping oil-soaked rags or clothing in pockets.
Hygiene measures	Avoid prolonged and repeated contact with skin, particularly with used oil. Wash hands with soap and water before eating, drinking, smoking and using toilet facilities. Use a suitable skin cream after washing. Do not use solvents, petrol or abrasive cleaners to remove oil from the skin.
Environmental exposure controls	Avoid release to the environment. Prevent discharge to drains and watercourses. See Sections 6, 12 and 13.

SECTION 9 - Physical and chemical properties

Physical state at 20 °C	Liquid
Appearance / colour	Clear and bright; dark amber
Odour	Mild characteristic hydrocarbon odour
Odour threshold	No data available
pH	Not applicable
Melting / freezing point	No data available
Pour point	Typically below -6 °C (refer to product technical data sheet)
Initial boiling point / range	Approximately 315 °C
Flash point	> 220 °C (Cleveland Open Cup, ASTM D92)
Evaporation rate	No data available
Flammability (solid, gas)	Not applicable - liquid

Upper / lower flammability or explosive limits	No data available
Vapour pressure	< 0.01 mmHg at 37.8 °C (100 °F)
Vapour density (air = 1)	> 1
Relative density / density at 15 °C	0.87 - 0.90 kg/l
Solubility	Soluble in hydrocarbons; insoluble in water
Partition coefficient n-octanol/water	No data available for the mixture
Auto-ignition temperature	No data available
Decomposition temperature	See Sections 7 and 10; do not heat above 65 °C
Kinematic viscosity at 40 °C	90 - 160 mm ² /s (cSt), grade dependent
Kinematic viscosity at 100 °C	SAE 30: 9.3 - < 12.5 mm ² /s; SAE 40: 12.5 - < 16.3 mm ² /s
Explosive properties	Not explosive
Oxidising properties	Not oxidising
Other information - DMSO extract (mineral oil only), IP 346	< 3 % w/w

SECTION 10 - Stability and reactivity

10.1 Reactivity	No dangerous reaction known under conditions of normal use.
10.2 Chemical stability	Stable product at conventional temperatures for storage, handling and use.
10.3 Possibility of hazardous reactions	Hazardous polymerisation will not occur. No hazardous reactions expected under normal conditions of storage and use.
10.4 Conditions to avoid	Excessive heat. Do not heat above 65 °C. Sources of ignition. Prolonged exposure to high temperatures, which promotes oxidation and thermal decomposition.
10.5 Incompatible materials	Strong oxidising agents. Powerful acids.
10.6 Hazardous decomposition products	Hydrogen sulphide. Thermal decomposition also produces oxides of carbon, sulphur and phosphorus and other unidentified organic compounds. If decomposition is suspected, or if the product has been overheated, do not open the container; discontinue heating and secure the unit. Initiate emergency procedures, taking all necessary precautions to avoid exposure to noxious or flammable gases (e.g. hydrogen sulphide), such as evacuation of contaminated areas and use of suitable respiratory protection.

SECTION 11 - Toxicological information

11.1 Basis for assessment	Information given is based on data on the components and on the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole rather than for individual components.
Highly refined petroleum lubricant base oils	Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicity in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mist, well above applicable workplace exposure levels, include lung inflammatory reaction, lipoid granuloma formation and lipoid pneumonia. Acute and sub-acute studies involving exposure to lower concentrations at or near current workplace exposure levels produced no significant toxicological effects. In long-term studies (up to two years) no carcinogenic effects have been reported in any animal species tested.
Acute oral toxicity	LD50 > 5.0 g/kg (rabbit). Expected to be of low acute toxicity. May cause irritation of the gastrointestinal system; symptoms may include nausea. The hazard assessment is based on evaluation of data for similar materials or product components. Based on available data, the classification criteria are not met.

Acute dermal toxicity	LD50 > 5.0 g/kg (rabbit). The hazard assessment is based on evaluation of data for similar materials or product components. Based on available data, the classification criteria are not met.
Acute inhalation toxicity	Not expected to be harmful if inhaled under normal conditions of use. Contains a petroleum-based mineral oil; may cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing. Based on available data, the classification criteria are not met. Acute toxicity estimate: not determined.
Skin corrosion / irritation	Not expected to cause irritation or injury during normal industrial use, based on toxicological evaluation of this product. Prolonged or repeated skin contact may cause skin irritation including redness, burning, drying, cracking, dermatitis, oil acne and folliculitis. Based on available data, the classification criteria are not met.
Serious eye damage / eye irritation	Not expected to cause prolonged or significant irritation or injury during normal industrial use, based on toxicological evaluation of this product. Based on available data, the classification criteria are not met.
Respiratory or skin sensitisation	The mixture contains long chain alkyl phenol, a skin sensitizer, at a concentration which may approach the generic concentration limit for classification. Susceptible individuals may develop an allergic skin reaction. See the supplemental label statement in Section 2 and the note in Section 3.
Germ cell mutagenicity	Based on available data, the classification criteria are not met.
Carcinogenicity	Based on available data, the classification criteria are not met. See 'Additional information' below regarding used engine oil.
Reproductive toxicity	Based on available data, the classification criteria are not met.
STOT - single exposure	Based on available data, the classification criteria are not met.
STOT - repeated exposure	Based on available data, the classification criteria are not met.
Aspiration hazard	Based on available data, the classification criteria are not met. The kinematic viscosity of the mixture exceeds 20.5 mm ² /s at 40 °C.
Additional information - base oils and used oil	This product contains petroleum base oils which may be refined by various processes, including severe solvent extraction, severe hydrocracking or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report, nor have they been classified by the International Agency for Research on Cancer (IARC) as carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B). These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as confirmed human carcinogen (A1), suspected human carcinogen (A2) or confirmed animal carcinogen with unknown relevance to humans (A3). During use in engines, contamination of the oil with low levels of cancer-causing combustion products occurs. Used motor oils have been shown to cause skin cancer in mice following repeated application and continuous exposure. Brief or intermittent skin contact with used motor oil is not expected to have serious effects in humans if the oil is thoroughly removed by washing with soap and water.

Component data - phosphorodithioic acid, mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters, zinc salts	Acute oral toxicity: LD50 rat 3,150 mg/kg; OECD TG 401; GLP: no. May be harmful if swallowed. Acute inhalation toxicity: LC50 rat > 2.3 mg/l, 4 h; OECD TG 403; GLP: no. No adverse effect observed; classification criteria not met. Acute dermal toxicity: LD50 rat > 2,002 mg/kg; OECD TG 402; GLP: yes. Classification criteria not met. Skin corrosion / irritation: guinea pig, 4 h; OECD TG 404. Causes skin irritation. Specific concentration limits: Skin Irrit. 3, H316 at >= 1 - < 6.25 %; Skin Irrit. 2, H315 at >= 6.25 - 100 %. Serious eye damage / eye irritation: rabbit, 504 h; method 16 CFR 1500.42. Causes serious eye damage. Specific concentration limits: Eye Irrit. 2, H319 at >= 10 - < 12.5 %; Eye Dam. 1, H318 at >= 12.5 - 100 %. Skin sensitisation: Buehler test, guinea pig; OECD TG 406. Does not cause skin sensitisation; classification criteria not met. Genotoxicity in vitro: Ames test, Salmonella typhimurium with and without metabolic activation; OECD TG 471; GLP: yes. Result: negative. Genotoxicity in vivo: micronucleus test, mouse (male and female), intraperitoneal injection; OECD TG 474; GLP: yes. Result: negative. Carcinogenicity: no data available. Reproductive toxicity: rat, male and female, oral; NOAEL 160 mg/kg; OECD TG 422; GLP: yes; read-across (analogy). Classification criteria not met. STOT single and repeated exposure: classification criteria not met. Aspiration toxicity: classification criteria not met. Note: the specific concentration limits above are the basis on which this component, present at 0.1 - < 1 % w/w, does not classify the mixture.
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SECTION 12 - Ecological information

12.1 Toxicity - product	Toxicity to fish: no data is available on the product itself. Toxicity to daphnia and other aquatic invertebrates: no data is available on the product itself. Toxicity to algae: no data is available on the product itself. The product is not expected to be readily biodegradable and floats on water. Spillages may form a film on the water surface, causing physical damage to organisms and impairing oxygen transfer.
Toxicity - component: phosphorodithioic acid, mixed O,O-bis(1,3-dimethylbutyl and iso-Pr) esters, zinc salts	Fish: LL50 (Oncorhynchus mykiss, rainbow trout) 4.5 mg/l, 96 h; semi-static test; OECD TG 203; GLP: yes. Toxic to aquatic life. Aquatic invertebrates: EL50 (Daphnia magna) 23 mg/l, 48 h; static test; OECD TG 202; GLP: yes. Harmful to aquatic life. Algae: EC50 (Desmodesmus subspicatus) 21 mg/l, 72 h; static test; OECD TG 201; GLP: yes. Harmful to aquatic life. Bacteria: IC50 10,000 mg/l, 3 h; respiration inhibition test. Chronic toxicity to aquatic invertebrates: NOEC 0.4 mg/l, 21 d (Daphnia magna); OECD TG 211; GLP: yes. Toxic to aquatic life with long lasting effects.
12.2 Persistence and degradability	No data is available on the product itself. Component - zinc dithiophosphate: biodegradability, aerobic activated sludge, concentration 10 mg/l; biodegradation 1.5 % in 28 d; OECD TG 301B; GLP: yes. Not readily biodegradable. Stability in water (hydrolysis, OECD TG 111): 6.6 % at 50 °C after 120 h at pH 7; 0 % at 50 °C after 120 h at pH 4; 0 % at 50 °C after 120 h at pH 9.
12.3 Bioaccumulative potential	Bioconcentration factor: no data available on the product itself. Octanol/water partition coefficient: no data available on the product itself. Component - zinc dithiophosphate: log Pow 0.56; read-across (analogy). Owing to the n-octanol/water distribution coefficient, accumulation in organisms is not expected.
12.4 Mobility in soil	No data is available on the product itself. Floats on water. Component - zinc dithiophosphate: after release, adsorbs onto soil.

12.5 Results of PBT and vPvB assessment	No data is available on the product itself. Component - zinc dithiophosphate: the substance is not considered to be persistent, bioaccumulative and toxic (PBT), nor very persistent and very bioaccumulative (vPvB).
12.6 Other adverse effects	Test data on the impurity overrides the calculated contribution of that impurity to the aquatic classification of the mixture.

SECTION 13 - Disposal considerations

13.1 Waste treatment methods - product	Do not discharge into the sewerage system, surface water or the natural environment. Waste product may be disposed of in a suitable incinerator or recovered for re-refining, provided that national and local legislation is complied with. Recovery should be carried out by a licensed specialist waste contractor. Used oil is a controlled / hazardous waste in most jurisdictions and must be handled accordingly. On board ship, retain in the waste oil tank and discharge only to an approved reception facility, in accordance with MARPOL Annex I.
Contaminated packaging	Empty containers retain product residue. Drain thoroughly, close properly and return to a drum reconditioner or dispose of through an approved contractor. Do not cut, weld, drill or apply heat to empty containers (see Section 7).

SECTION 14 - Transport information

General	Not classified as a dangerous good for transport. The description shown may not apply to all shipping situations. Consult the applicable dangerous goods regulations for additional description requirements (e.g. technical name) and for mode-specific or quantity-specific shipping requirements.
14.1 UN number	Not applicable
14.2 UN proper shipping name	Lubricating oil
14.3 Transport hazard class(es)	Not applicable
14.4 Packing group	Not applicable
14.5 Environmental hazards	Not classified as a marine pollutant under the IMDG Code. Not classified as environmentally hazardous for land transport.
14.6 Special precautions for user	Not dangerous cargo. Keep separate from foodstuffs. Handle in accordance with Sections 6, 7 and 8.
Modal information	Sea (IMO / IMDG): lubricating oil; not regulated as dangerous goods under the IMDG Code. Air (ICAO / IATA): lubricating oil; not regulated as dangerous goods under the ICAO Technical Instructions or the IATA DGR. Road / rail: not regulated. United States (DOT): lubricating oil; not regulated as a hazardous material for transportation under 49 CFR.
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. Carriage of this product in bulk as cargo would fall under MARPOL Annex I (oil).

SECTION 15 - Regulatory information

15.1 Safety, health and environmental regulations specific to the product	Singapore: - Workplace Safety and Health Act and subsidiary regulations, including the Workplace Safety and Health (General Provisions) Regulations - permissible exposure levels for mineral oil mist apply (Section 8). - Fire Safety Act and Fire Safety (Petroleum and Flammable Materials) Regulations: not applicable; the product is not a petroleum or flammable material as defined. - Environmental Protection and Management Act and Environmental Protection and Management (Hazardous Substances) Regulations: not applicable. - Classification and labelling in accordance with SS 586-2 and SS 586-3. International: - MARPOL 73/78 Annex I (oil) applies to discharge and to disposal of used oil. - IMO IBC Code: not applicable.
Chemical inventory status	TSCA (United States): this product and/or its components are listed on the Toxic Substances Control Act inventory. Australia (AIIIC): all components are in compliance with chemical notification requirements in Australia. Canada (DSL/NDSL): all substances contained in this product are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List or are exempted. China (IECSC): all components of this product are listed on the Inventory of Existing Chemical Substances in China. Japan (ENCS): all components are in compliance with the Chemical Substances Control Law of Japan. Republic of Korea (KECL): all components are in compliance in Korea. New Zealand (NZIoC): all components are in compliance with chemical notification requirements in New Zealand. Philippines (PICCS): all components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969). Taiwan (TCSCA): all components of this product are listed on the Taiwan inventory.
Other national provisions	United States - Clean Water Act (CWA): this material is classified as an oil under Section 311 of the CWA and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters, must be reported to the EPA National Response Center at (800) 424-8802. United States - OSHA: although not classified as hazardous under SS 586, the product is regarded as hazardous under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, because an occupational exposure limit exists for mineral oil mist. Ozone-depleting substances (40 CFR 82, Clean Air Act): this material does not contain, nor was it directly manufactured with, any Class I or Class II ozone-depleting substances.
15.2 Chemical safety assessment	No chemical safety assessment has been carried out for this mixture.

SECTION 16 - Other information

Revision date	09 September 2026
Revision number	Rev. 0
Reason(s) for revision	First issue by Energy Spring Pte Ltd.
Reference(s)	Singapore Standard SS 586-2:2022 and SS 586-3:2022 (Hazard communication for hazardous chemicals and dangerous goods). Data supplied by the manufacturer of the product.
Recommended uses and restrictions on use	See Section 1.

Full text of hazard statements referred to in Section 3	H303: May be harmful if swallowed. H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H317: May cause an allergic skin reaction. H318: Causes serious eye damage. H373: May cause damage to organs through prolonged or repeated exposure. H401: Toxic to aquatic life. H411: Toxic to aquatic life with long lasting effects.
Abbreviations and acronyms	ACGIH - American Conference of Governmental Industrial Hygienists; Asp. Tox. - aspiration toxicity; BN - base number; CAS - Chemical Abstracts Service; COC - Cleveland Open Cup; DMSO - dimethyl sulphoxide; EC50 / EL50 - effect concentration / loading 50 %; GHS - Globally Harmonized System; GLP - good laboratory practice; IARC - International Agency for Research on Cancer; IBC - International Bulk Chemical Code; IC50 - inhibitory concentration 50 %; IMDG - International Maritime Dangerous Goods; LC50 / LD50 / LL50 - lethal concentration / dose / loading 50 %; NOAEL - no observed adverse effect level; NOEC - no observed effect concentration; OECD TG - Organisation for Economic Co-operation and Development Test Guideline; PBT - persistent, bioaccumulative and toxic; PEL - permissible exposure level; SAE - Society of Automotive Engineers; Skin Sens. - skin sensitisation; STEL - short-term exposure limit; STOT RE - specific target organ toxicity, repeated exposure; TPEO - trunk piston engine oil; TWA - time-weighted average; vPvB - very persistent and very bioaccumulative.

This dossier supplements the technical notifications for use, but does not replace them. The information which it contains is based on our knowledge relating to the product in question on the date indicated.

The information is given in good faith. The user's attention is also drawn to the possible risks incurred if a product is employed for uses other than those for which it was designed.

This information dossier does not, under any circumstances, discharge the user from the obligation of being aware of, and of applying, all the texts which govern his sphere of activity. He shall be solely responsible for taking the precautions associated with the use which he makes of the product.

All the statutory provisions referred to are intended simply to assist the recipient in fulfilling the obligations incumbent upon him. This enumeration must not be considered to be exhaustive. The recipient must ensure that no other obligations are incumbent upon him, as a result of texts other than those cited, relating to the holding and handling of the product, for which he alone is responsible.

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